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First report of *Morganella compacta* (*Agaricales*, *Lycoperdaceae*) from South America

Marcos Mateus Barros Barbosa[1*], Maria Aparecida da Silva[1], Rhudson Henrique Santos Ferreira da Cruz[2], Francisco de Diego Calonge[3] & Iuri Goulart Baseia[2]

[1]*Programa de Pós-Graduação em Biologia de Fungos, Depto. Micologia, Centro de Ciências Biológicas, Universidade Federal de Pernambuco, Av. Nelson Chaves s/n, 50670-420, Recife, PE, Brazil*

[2]*Depto. Botânica, Ecologia e Zoologia, Universidade Federal do Rio Grande do Norte, Campus Universitário, CEP: 59072-970, Natal, RN, Brazil*

[3]*Real Jardín Botánico, CSIC. Plaza de Murillo 2,28014,Madrid,Spain*

*Correspondence to: *marcosmbb@gmail.com*

Abstract— *Morganella compacta* is recorded for the first time from South America. This species is found in Northeastern Brazil growing on sandy soil of dune ecosystems. Detailed descriptions, illustrations of basidiomata and basidiospores SEM are given.

Key words— *Basidiomycota*, taxonomy, gasteromycetes, neotropics

Introduction

Morganella Zeller was segregated from the genus *Lycoperdon* Pers. in 1948 and since then has been sporadically studied by a number of taxonomists such as Kreisel & Dring (1967), Ponce de León (1971), Morales et al. (1974) and more recently by Suarez & Wright (1996), Krüger & Kreisel (2003), and Cortez et al. (2007). According to Kreisel & Dring (1967) it has a similar distribution pattern to that of the genus *Bovista* Pers., with worldwide occurrence, although most of the species are only known from the neotropical zone. More recently, Larsson & Jeppson (2008) suggested *Morganella* as a subgenus of *Lycoperdon* based on ITS and LSU sequences of *M. fuliginea* (Berk. & M.A. Curtis) Kreisel & Dring and *M. subincarnata* (Peck) Kreisel & Dring; however, their analyses did not include the type species, *M. mexicana* Zeller.

Members of *Morganella* are characterized by producing epigeal basidiomata, up to 5 cm in height, with the presence of an apical pore and a sterile base. It differs from *Vascellum* F. Šmarda in the absence of a diaphragm and from *Lycoperdon*

Figure 1. Dune forest of the Parque Estadual Dunas do Natal.

in the absence of a true capillitium and the presence of a paracapillitium (Kreisel & Dring 1967, Suárez & Wright 1996, Cortez et al. 2007, Bates et al. 2009). Kreisel & Dring (1967) note that most species are lignicolous, occurring on decomposing trunks and branches. However, there are records of the genus from other substrates, such as *M. subincarnata* growing on moss (Smith 1951, as *Lycoperdon subincarnatum*) and *M. fuliginea* on soil organic matter (Suárez & Wright 1996) and organic-poor soil and rocks (Reid 1977).

As part of a revision of the gasteroid fungi from selected areas of Atlantic rainforests from Northeastern Brazil, the authors identified a *Morganella* species not previously reported from South America. The present paper presents a description of the Brazilian specimens and a discussion of its taxonomy and distribution.

Material & methods

The study was conducted in Parque Estadual Dunas do Natal (Fig. 1), a 1172 hectare Atlantic Forest remnant consisting of dune vegetation, located in the state of Rio Grande do Norte, Brazil (Fig. 2). Basidiomata were collected during the rainy seasons (April to August) from 2005 to 2010, following the methodology proposed by Fidalgo & Bononi (1984). Specimens were studied using routine laboratory techniques cited by Kreisel & Dring (1967), Suárez & Wright (1996) and Calonge (1998). Species identification

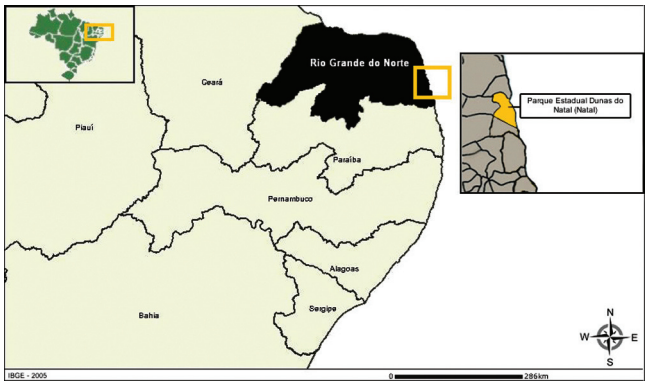

Figure 2. Map of Brazil showing the location of areas studied.

followed Zeller (1948), Kreisel & Dring (1967), Ponce de León (1971) and Suárez & Wright (1996). The color data are from Kornerup & Wanscher (1978). The material is preserved in the herbarium UFRN-Fungos.

Taxonomy

Morganella compacta (G. Cunn.) Kreisel & Dring, Feddes Repert. 74: 116, 1967
Plate I, II; Fig. 3

≡ *Lycoperdon compactum* G. Cunn., Trans. New Zeal. Inst. 57: 195, 1926

Basidiomata epigeous, subglobose to pyriform, 15–33 × 10–23 mm, constricted into a short stem-like base, 10–15 mm in length, with the possible presence of a bulbous base. Rhizomorph present, well-defined and branched, 0.45 mm diam. in each filament and up to 50 mm in length, impregnated with debris and soil particles. Exoperidium white when young, ageing violet (18A4) to hair brown (5E4), finally turning greyish yellow (4B4) to olive brown (4E3), surface granular, evanescent, remaining as a basal sheath. Endoperidium slightly areolate, papery thin and persistent, dark blond (5D4), mouth circular to irregular, developing late. Gleba spongy and white when young, becoming olive brown (4E3) and powdery with maturity. Pseudocolumella present, elliptical, up to 8 mm in length. Sterile base present and conspicuous, pale yellow (4A3), cellular-like, spongy, with chambers 0.5–1 mm diam. Basidiospores globose, 3.5–4 µm diam., asperulate, hyaline brown with oil drops, pedicel present and short, 0.6–2 µm in length. Capillitium absent or rare. Paracapillitium present, hyaline, septate and cyanophilic with glebal membranes. Exoperidium composed of inflated hyphae and subglobose to irregular sphaerocysts, 15–20 µm diam.

Ecology & distribution—Grows in dune soil with scant organic matter, partially shaded and sometimes on wood. Known from Brazil; New Zealand

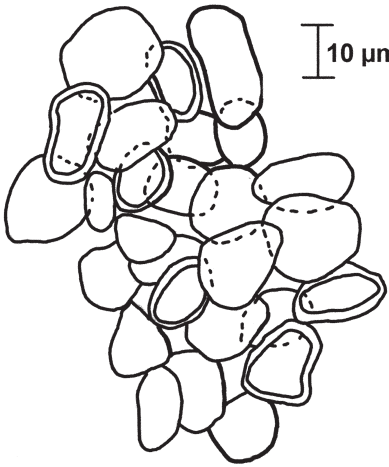

Figure 3. *Morganella compacta*. Sphaerocysts of the exoperidium.

(Cunningham 1944, Ponce de León 1971); Thailand (Ellingsen 1982); Costa Rica (Calonge et al. 2005).

Specimens examined — **BRAZIL. Rio Grande do Norte State**: Natal, Parque Estadual Dunas do Natal, 22/V/2010, leg. MMB Barbosa. UFRN-Fungos 1400; 23/IV/2010, leg. MMB Barbosa, JO Souza & C Dore, UFRN-Fungos 1401; 07/VII/2009, leg. RHSF Cruz, JJS Oliveira & MIM Cocentino, UFRN 1329; 12/VI/2009, leg. BDB Silva & EP Fazolino, UFRN 1330; 12/VI/2009, leg. BDB Silva & JJS Oliveira, UFRN 1006; 22/VI/2005, leg. MMB Barbosa & IG Baseia, UFRN-Fungos 664; 25/V/2005, leg. MMB Barbosa & IG Baseia, UFRN-Fungos 670; 20/V/2005, leg. MMB Barbosa& IG Baseia, UFRN-Fungos 651; 08/VII/2006, leg. MMB Barbosa, EP Fazolino & TBS Otoni, UFRN-Fungos 864.

Comments— This species is well characterized by the deciduous exoperidium that detaches at maturity, leaving the areolated endoperidium exposed on the upper portion. It is important to underscore that *Morganella compacta* is described as lignicolous (Cunningham 1944, Calonge et al. 2005), as are most species of this genus (Kreisel & Dring 1967). However, most of our specimens were found growing in sandy soil and rarely on dead wood. With a few exceptions, such as the dimensions of our basidiomata, which are slightly larger, and the areolae of the endoperidium, which are more inconspicuous in our specimens, the characters of the specimens analyzed agree with literature descriptions of *M. compacta* (Cunningham 1944, Smith 1951, Kreisel & Dring 1967, Ponce de León 1971, Calonge et al. 2005). This species agrees in many characters with *M. subincarnata*, but is distinguished by its asperulate spores compared to the echinulate spores of *M. subincarnata*. The areolate endoperidium also

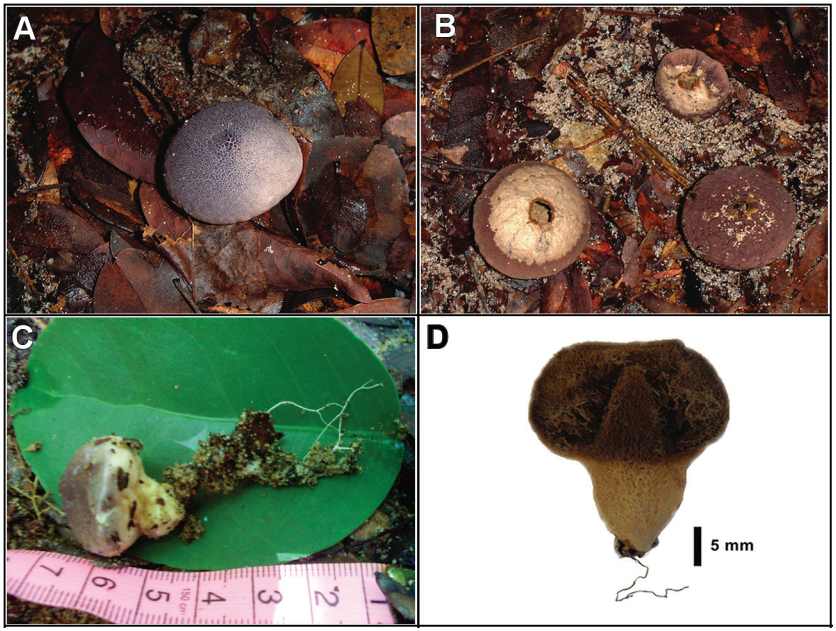

Plate 1. *Morganella compacta.* A: immature basidioma; B: mature basidioma; C: basidioma showing the rhizomorph; D: section of a basidioma showing the columella.

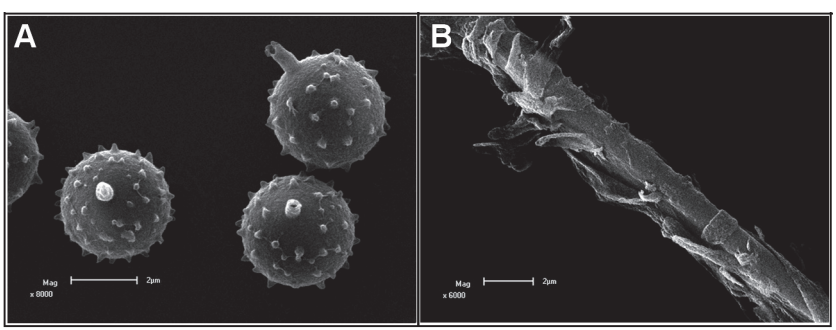

Plate 2. *Morganella compacta.* A: SEM of spores; B: SEM of the paracapillitium.

distinguishes *M. compacta* from *M. afra* Kreisel & Dring, which has a smooth endoperidium. This is the first record of *M. compacta* for South America.

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References

Bates ST, Roberson RW, Desjardin DE. 2009. Arizona gasteroid fungi I: *Lycoperdaceae* (*Agaricales*, *Basidiomycota*). Fungal Diversity 37: 153–207.

Calonge FD, Mata M, Carranza J. 2005. Contribución al catálogo de los *Gasteromycetes* (*Basidiomycotina*, *Fungi*) de Costa Rica. Annales Jard. Bot. Madrid 62(1): 23–45. doi:10.3989/ajbm.2005.v62.i1.26

Calonge FD. 1998. *Gasteromycetes*: *Lycoperdales, Nidulariales, Phallales, Sclerodermatales, Tulostomatales*. Flora Micológica Ibérica 3: 271 pp.

Cortez VG, Calonge FD, Baseia IG. 2007. Rick's species revision 2: *Lycoperdon benjaminii* recombined in *Morganella*. Mycotaxon 102: 425–429.

Cunningham GH. 1944. The *Gasteromycetes* of Australia and New Zealand. Dunedin, J. McIndoe: 236 pp.

Ellingsen H. 1982. Some *Gasteromycetes* from Northern Thailand. Nord. J. Bot. 2: 283–285. doi: 10.1111/j.1756–1051.1982.tb01190.x

Fidalgo O, Bononi VL. 1984. Técnicas de coleta, preservação e herborização de material botânico. Ser. Man. 4, São Paulo, Instituto de Botânica. 61 pp.

Kornerup A, Wanscher JH. 1978. Methuen Handbook of Colours. Third edition. London, Eyre Methuen. 252 pp.

Kreisel H, Dring DM. 1967. An emendation of the genus *Morganella* Zeller (*Lycoperdaceae*). Feddes Repertorium, 74: 109–122. doi: 10.1002/fedr.19670740105

Krüger D, Kreisel H. 2003. Proposing *Morganella* subgen. *Apioperdon* subgen. nov. for the puffball *Lycoperdon pyriforme*. Mycotaxon 86: 169–177.

Larsson E, Jeppson M. 2008. Phylogenetic relationships among species and genera of *Lycoperdaceae* based on ITS and LSU sequence data from north European taxa. Mycological Research 112: 4–22. doi: 10.1016/j.mycres.2007.10.018

Morales MI, Nassar M, Sáenz JA. 1974. *Lycoperdaceae* of Costa Rica. I. The genus *Morganella*. Rev. Biol. Trop. 21: 221–227.

Ponce de León P. 1971. Revision of the genus *Morganella* (*Lycoperdaceae*). Fieldiana Bot. 34: 27–44.

Reid DA. 1977. Some *Gasteromycetes* from Trinidad and Tobago. Kew Bulletin 31(3): 657–690. doi: 10.2307/4119418

Smith AH. 1951. Puffballs and their allies in Michigan. Ann Arbor, University of Michigan Library. 132 pp.

Suárez VL, Wright JE. 1996. South American *Gasteromycetes* V: The genus *Morganella*. Mycologia 88: 655–661.

Zeller SM. 1948. Notes on certain *Gasteromycetes*, including two new orders. Mycologia 40: 639–668. doi: 10.2307/3755316